

**What is claimed is:**

1           1.    A programmable logic module, comprising:  
2                a first printed circuit board having a socket and  
3                a downloading unit;  
4                a field programmable gate array (FPGA) disposed on  
5                the first printed circuit board;  
6                a nonvolatile memory storing program codes for  
7                programming the field programmable gate  
8                array, wherein the nonvolatile memory is  
9                fixed by soldering to a second printed circuit  
10              board with a plurality of pins corresponding  
11              to the socket, and the second printed circuit  
12              board is plugged into the socket of the first  
13              printed circuit board; wherein the  
14              nonvolatile memory downloads program codes  
15              thereof to the field programmable gate array  
16              by the downloading unit.

1           2.    The programmable logic module as claimed in Claim  
2           1, wherein the nonvolatile memory is fixed by soldering to  
3           the second printed circuit board by a surface mounted  
4           technology.

1           3.    The programmable logic module as claimed in Claim  
2           2, wherein the nonvolatile memory is packaged in a COB (chip  
3           on board) package.

1           4.    The feedback control I/O buffer as claimed in Claim  
2           1, wherein the nonvolatile memory is packaged in a thin small

outline package (TSOP) or a small outline J-lead package (SOJ).

5. The programmable logic module as claimed in Claim 1, wherein the nonvolatile memory is packaged in a quad flat package, a plastic quad flat package (FQGP), a thin quad flat package or a quad flat J-lead package.

6. The programmable logic module as claimed in Claim 1, wherein the nonvolatile memory is a flash memory.

7. The programmable logic module as claimed in Claim 1, wherein the nonvolatile memory is packaged in a ball grid array (BGA) package or fine pitch BGA package.

8. An upgrade method for a programmable logic module, wherein the programmable logic module has a first printed circuit board with a socket, a downloading unit, a field programmable gate array and a nonvolatile memory is fixed by soldering to a second printed circuit board, and the second printed circuit is plugged into the socket, the upgrade method comprising:

removing the second printed circuit with the nonvolatile memory from the socket on the first printed circuit board;

disposing the second printed circuit with the nonvolatile memory on a writer;

writing a new program into the nonvolatile memory by the writer;

inserting the second printed circuit board with the nonvolatile memory into the socket, wherein the new program is stored in the nonvolatile memory; and

18           downloading the new program stored in the nonvolatile  
19           memory to the field programmable gate array by the  
20           downloading unit.

1           9.    The upgrade method as claimed in Claim 8, wherein  
2           the nonvolatile memory is fixed to the second printed circuit  
3           board by surface mounted technology.

1           10.  A programmable logic module, comprising:  
2           a first printed circuit board having a power pin region  
3           and a plurality of I/O pin regions, wherein the  
4           power pin region is separated from the I/O pin  
5           regions, each power pin region and I/O pin region  
6           has a plurality of pins;  
7           a field programmable gate array disposed on the first  
8           printed circuit board, wherein the field  
9           programmable gate array has a plurality of power  
10          terminals and I/O terminals;  
11          a nonvolatile memory storing program codes for  
12          programming the field programmable gate array;  
13          wherein each I/O terminal of the field programmable gate  
14          array is electrically connected to a corresponding  
15          pin in the I/O pin region, all power terminals of  
16          the field programmable gate array are electrically  
17          connected to pins in the power pin region, and the  
18          pins in the power pin region and the I/O pin regions  
19          are connected to external circuits through  
20          different connectors.

1           11.  The programmable logic module as claimed in Claim  
2           10, wherein the first printed circuit board further has a

3 socket, and the nonvolatile memory is fixed by soldering to  
4 the second printed circuit board.

1 12. The programmable logic module as claimed in Claim  
2 11, wherein the second printed circuit board has a plurality  
3 of pins corresponding to the socket such that the second  
4 printed is plugged into the first printed circuit board.

1 13. The programmable logic module as claimed in Claim  
2 11, wherein the nonvolatile memory is soldered on the second  
3 printed circuit board by surface mounted technology.

1 14. The programmable logic module as claimed in Claim  
2 10, wherein the nonvolatile memory is a flash memory.